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Recent Published Book Chapter:
Land Title Solutions Across the World with Blockchain: A Review

Associate Professor Dr. Liew Chee Yoong's research interests are in corporate governance, corporate finance, green and sustainable finance, information economics and management, market microstructure, applied finance and economics as well as interdisciplinary business research. His research has been published in Social Science Citation Indexed (SSCI) JCR Q1 journals, ABDC "A" ranked journals, ABS (AJG) ranked journals and Scopus Indexed (Q1) ranked journals.

Dr Marcia Edna Santhana Rajan has served UCSI University as a lecturer in Accounting and Finance for the past 16 years. She obtained a Ph.D. in Business Economics in 2021 and has since embarked on her research journey in behavioral finance and economics, retirement and investment planning, and more recently, in fintech, as well as in green and sustainable finance. Her recent work has been published in WOS and Scopus indexed (Q2) ranked journal.

Dr. Hatim Dawood is a versatile professional with a 24-year track record in banking, manufacturing, airport operations, and technology. He specializes in driving impactful initiatives across the digital economy, fintech, insurtech, mobile banking, mobile technology, AI, blockchain, crypto assets, digital transformation, change management, and project management. He completed his doctoral research under Assoc. Prof. Dr. Liew CY, Dr. Rajan MES and Prof. Dr. Cham at UCSI University. .

The book entitled "Blockchain in Real Estate: Theoretical Advances and New Empirical Applications"

Summary
This book provides an overview of the latest developments in real estate blockchain technology and its applications. It explores blockchain technologies in all industries, cryptocurrencies' effect on the payment system, money transfers and currency exchange, investment, venture capital, etc. It examines the urgent need to build trust in digital technologies as companies rethink their approach to operations. It describes how Blockchain technology can enable property or land ownership to be managed through immutable records and verifiable transaction history to register and transfer land and how it can also be used to improve the efficiency of property management through the use of smart contracts.

Introduction
Land titles establish ownership or rights to a property or land and are used to transfer ownership or grant land use rights. They typically include information about the owner, land location, size, boundaries, and encumbrances or rights. Land titles are registered through government agencies like land registries or title offices. Registering land titles is vital for the economy, landowners, citizens, and investors. It establishes property rights, encourages land investment, and increases access to credit.

Thus, land title registration can positively affect economic activity, land use, and productivity. It is also crucial to landowners as it provides a legal framework to protect against fraudulent claims, boundary disputes, and other issues that may arise due to unclear land ownership. A formal land title can facilitate access to credit, land transfer, and future planning and ensure equitable land distribution and access for citizens, particularly for marginalized communities. Moreover, investors benefit from increased investor confidence which leads to economic growth.

Although land title administration is important, it suffers numerous challenges globally. Acquiring and managing land titles can be inefficient and complicated in many countries as shown in various studies. For example, the cumbersome and lengthy land title administration process involves multiple government bodies and different types of documentation, making it more challenging to manage. Land registration can also be costly and time-consuming.

These inefficiencies in land title administration can be attributed to the paper-based systems used to manage land titles, which are challenging to access and maintain and are vulnerable to natural and human disasters. Additionally, land conflicts exist globally. Incomplete documentation leads to disputes over land ownership among many landowners worldwide.

Differing land ownership laws pose another issue since these vary significantly between countries and regions, being influenced by history, culture, geography, and politics, making it challenging to establish a uniform legal framework. Worst still, the prevalence of corruption and bribery hinders the procurement of clear and secure land titles in some countries. For instance, governmental officials may demand bribes or engage in fraudulent practices to alter land titles which lead to legal challenges. Finally, the advent of the COVID-19 pandemic intensified the challenges in completing registration procedures for land titles which required additional workforce—showing that such a calamity can adversely affect the real estate industry, land, and properties.

Use of Blockchain Technology
In this connection, the use of various technologies has been shown to improve land title registration, management efficiency and accuracy, while reducing fraud and disputes over ownership, as well as increasing transparency and accountability. Of particular interest here, is the blockchain ledger system. Blockchain can safely record and verify transactions with blocks, nodes, consensus protocol, cryptography, smart contracts, and distributed ledgers. It offers a decentralized system to decrease fraud and disputes in land ownership while enhancing the transparency and security of land titles. Its application is seen across industries such as finance, healthcare, and logistics since it can provide a reliable and transparent way of recording and verifying transactions.

The usefulness of blockchain in this topic motivates the formulation of the study's research questions which aim to explore the global impact of blockchain technology on land title challenges, encompassing its resolution, management of elements, realization of benefits, and the strategies employed to address associated challenges.

The study employed a methodology that involved reviewing the literature on blockchain's role in addressing land title issues and registration challenges. Published articles between 2015 and 2023 were extracted from the Scopus Database using specific keywords. The articles were categorized into six groups, and after screening for duplicates and missing metadata, 138 records were selected. The NVivo software (version 1.7.1) for data coding, text searching, and file management was used for further analysis.

Study Findings
To resolve land title issues, the study concludes that blockchain can considerably transform land title transactions by reducing costs, improving accessibility, and enhancing data security.

The technology aims to create an efficient and user-friendly land registration process, addressing fraud and ownership issues. Standardized smart contracts can automate processes, increasing registration efficiency, whereas transparency helps manage legal consistencies. Blockchain's decentralized nature minimizes corruption and bribery, ensuring reliability in land title registration.

Furthermore, it even proves valuable during pandemics like COVID-19, enabling safe and digital transactions without physical interactions or paperwork. Authorities profit from easier monitoring and regulation of land title transactions through blockchain transparency and accessibility. To manage land title elements, the study infers that blockchain transforms land title management by offering a decentralized ledger for recording ownership information, ensuring tamper-proof records of transfers, monitoring liens, and adhering to legal prerequisites. Its implementation improves efficiency, security, and accuracy, reducing risks of fraud and errors.

Additional exploration and adoption of blockchain technology have the potential to revolutionize land title management systems, fostering transparency and trust among stakeholders in land transactions. In terms of land title benefit attainment, blockchain establishes a transparent and secure system for transferring ownership rights since it can enable an unchangeable and distributed ledger of land title transactions. Smart contracts ensure authorized and secure transfers, while the decentralized nature of blockchain enhances transparency and security

Objective Alignment

These benefits align with several key objectives, including achieving proof of ownership and transparency, preventing fraud, increasing value in land title management, and facilitating access to financing and enhanced liquidity. Finally, blockchain is also efficient in dealing with challenges faced.

The findings show that there are various methods to address the blockchain scalability challenge - for example, Segregated Witness, which separates signature data from transaction data, and Lightning Network (Xie et al., 2019), a second-layer solution enabling off-chain transactions. In addition, although interoperability hinders communication between different networks, several solutions can address it, including atomic swaps for peer-to-peer trades, the Interledger Protocol (ILP) for cross-network transactions, and platforms like Polkadot and Cosmos using relay chains or hub-and-spoke architecture to connect diverse blockchain networks.

The challenge of maintaining the integrity and security of a blockchain network, which needs considerable computational resources, can be tackled through solutions like more efficient algorithms, reducing transaction data size, new consensus mechanisms, and off-chain solutions (sidechains, state channels, or sharing). These approaches can improve efficiency and scalability while minimizing computational power.

Contribution To Industry

The findings from this study extend a few practical contributions to land title solutions. It enhances transparency, accountability, consistency, efficiency, and security in land title registrations. The technology simplifies cross-border land transactions, reducing time and costs. For land property investors, blockchain creates a tamper-proof and secure land registry, streamlining registration processes, decreasing errors and corruption, and increasing transparency in land title administration. It also improves access to finance by providing a transparent record of land ownership, making it uncomplicated for landowners to use their land as collateral for loans and boosting investment in land property.

References

Alam, K. M. (2022). A blockchain-based land title management system for Bangladesh. Journal of King Saud University—Computer and Information Sciences, 34(6), 3096–3110. https://doi.org/10.1016/j.jksuci.2020.10.011

Ali, M. S. (2019). Applications of blockchains in the internet of things: A comprehensive survey. IEEE Communications Surveys and Tutorials, 21(2), 1676–1717. https://doi.org/10.1109/COMST.2018.2886932

Dutta, P. (2020). Blockchain technology in supply chain operations: Applications, challenges and research opportunities. Transportation Research Part E: Logis-tics and Transportation Review, 142, 102067. https://doi.org/10.1016/j.tre. 2020.102067

Kouhizadeh, M., Saberi, S., & Sarkis, J. (2021). Blockchain technology and the sustainable supply chain: Theoretically exploring adoption barriers. Interna-tional Journal of Production Economics, 231, 107831. https://doi.org/10. 1016/j.ijpe.2020.107831

Mintah, K. (2020). Skin lands in Ghana and application of blockchain technology for acquisition and title registration. Journal of Property, Planning and Envi-ronmental Law, 12(2), 147–169. https://doi.org/10.1108/JPPEL-12-2019-0062

Monrat, A. A., Schelen, O., & Andersson, K. (2019). A Survey of blockchain from the perspectives of applications, challenges, and opportunities. IEEE Access, 7, 117134–117151. https://doi.org/10.1109/ACCESS.2019.293 6094

Saull, A. (2020). Can digital technologies speed up real estate transactions? Journal of Property Investment and Finance, 38(4), 349–361. https://doi. org/10.1108/JPIF-09-2019-0131

Xie, J., Tang, H., Huang, T., Yu, F. R., Xie, R., Liu, J., & Liu, Y. (2019). A survey of blockchain technology applied to smart cities: Research issues and challenges. IEEE Communications Surveys & Tutorials, 21(3), 2794–2830. https://doi.org/10.1109/COMST.2019.2899617

Note:

The full chapter can be accessed at:

Liew, C. Y., & Rajan, M. E. S. (2024). Land Title Solutions Across The World With Blockchain: A Review. Blockchain in Real Estate: Theoretical Advances and New Empirical Applications, 233-255.

What Is Happening in the Nanoscale Wettability Modification in the Oil-wet Porous Medium?

Ts. Dr. Vahid Khosravi presently holds the dual role as a "Lecturer" from the Faculty of Engineering, Technology, and Built Environment as well as "Research Manager" at UCSI University's Centre of Excellence for Research Value Innovation and Entrepreneurship (CERVIE). Dr. Khosravi is actively involved in various professional organizations. He serves as a committee member of the UCSI-Cheras Low Carbon Innovation Hub Research Consortium. Furthermore, he is a member of the Malaysia Board of Technologists (MBOT) as a professional technologist and also a member of the Institution of Engineering and Technology (IET) of the UK. In recent years, Dr. Khosravi has contributed significantly to the field through the publication of remarkable papers in prestigious peer-reviewed journals. He primarily works on elucidating the wettability alteration mechanism and investigating surface complexity studies by employing various methods such as experimental activities and simulation tools. However, his research focuses on a wide range of topics, including wettability alteration, Smart Water technology, molecular dynamics simulation, surface complexity studies, predictive models, smart materials, and low-carbon technology. Recently, he has been extending his research in the field of eco-friendly technologies in accordance with Sustainable Development Goals (SDG) policies such as low-carbon technology and waste management. He is an editorial board member and reviewer of prestigious journals. Recently, he received an award as the "2022 Outstanding Reviewer from the Journal of Gas Science and Engineering (Q1, impact factor: 5.285)".
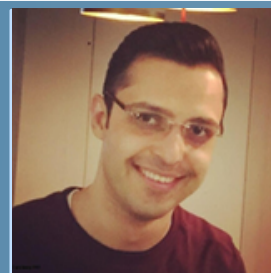
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Introduction

When it comes to wettability alteration, there has been considerable research on sandstone. While for the carbonate rocks, there is a growing need to provide a systematic study to elucidate the modification of wettability. In this matter, there is a few attentions to the interaction between crude oil and water at the carbonate interface, as most studies have underscored the wettability alterations at the mineral surface interactions (Adeyemi, Jadhawar, & Akanji, 2021; Chakravarty, Fosbøl, & Thomsen, 2015). So, to fundamentally understand the interaction of the oil/brine/rock system, the role of each component at the molecular scale requires to be studied and oil-water interactions shouldn't be overlooked.

In this vein, molecular dynamics simulation is known as a very useful tool to investigate the details of oil-water interaction in the reservoir medium at molecular scale. It is based on the premise that the positions and velocities of all particles can be accurately determined (Allen, 2004; Hansson, Oostenbrink, & van Gunsteren, 2002; Hollingsworth & Dror, 2018).
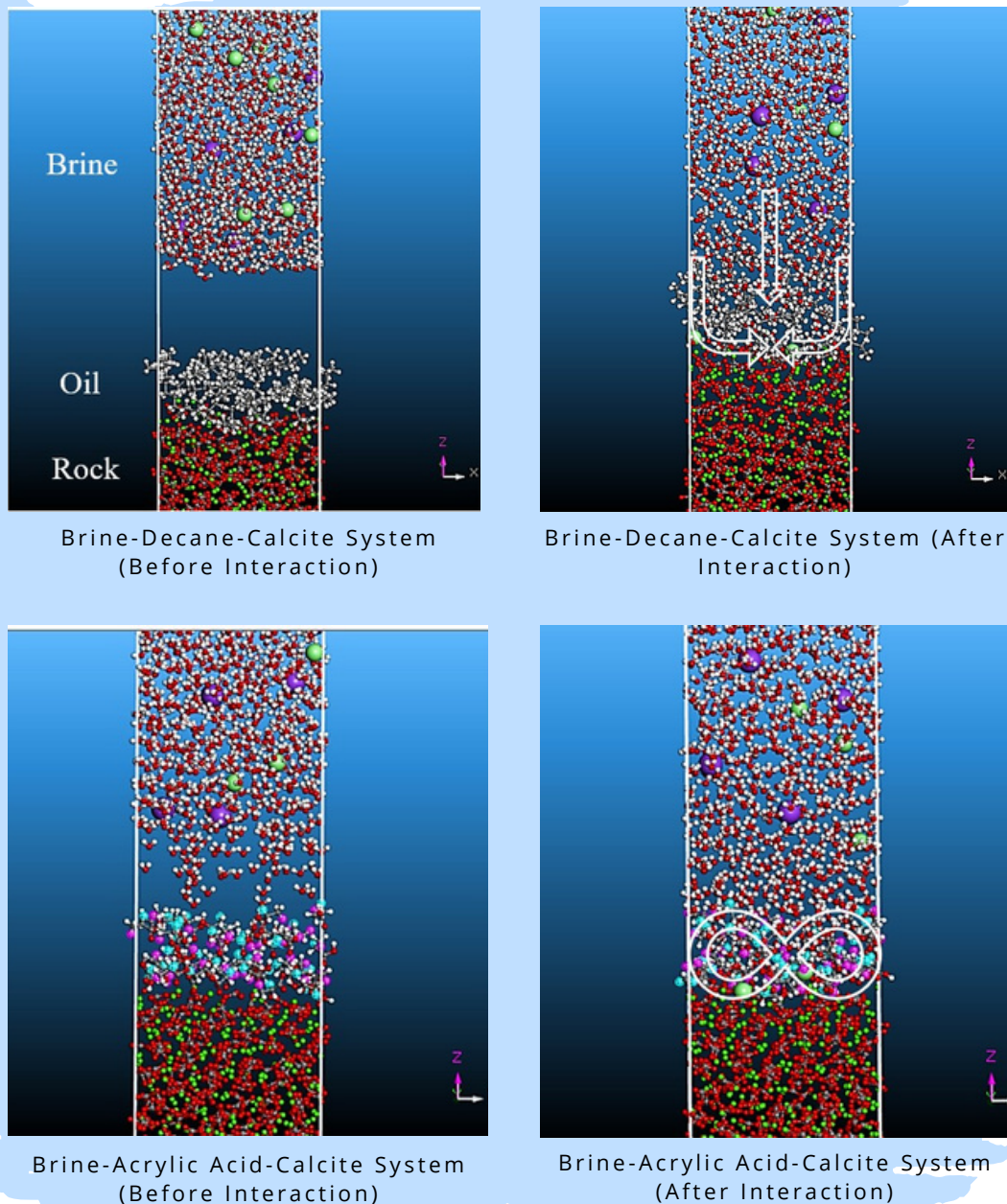
Roadmap

In this attempt, molecular dynamics simulation has been utilized to investigate the impact of polar and nonpolar oil components on modifying the wettability of a carbonate reservoir of the oil/brine/calcite system. Calcite is considered as the carbonate rock representative. This idea emanates from existing physicochemical interactions in the reservoir. Herein, the focus is on the interaction between NaCl brine ions and oil components to simulate water-oil interaction. Thus, the adsorption energy of polar and nonpolar oil components was compared to evaluate their respective roles in altering wettability. Also, the diffusion coefficient of the brine ions was computed through mean square displacement (MSD) plot to monitor the ions diffusivity. Besides, radial distribution function (RDF) and configurational changes are utilized to provide the graphical analysis of interactions in the oil/brine/calcite system.

Novelty

According to the interaction of the Brine-Decane-Calcite system, the brine tends to reach the surface from three directions: the center, the left, and the right sides. However, it is tough to sweep the oil from the surface to alter the wetness. The non-polar essence of decane weakens the interaction. This observation has been supported by adsorption energy and diffusivity outcomes where the results show less interactive ion exchange.

On the other hand, the interaction of the Brine-Acrylic Acid-Calcite system illustrates the turbulence strategy of the brine in the form of an eight shape, which successfully results in the sweeping oil molecules from the surface and approaching for creation of a water-wet status. In this matter, the increased values of adsorption energy and diffusion coefficient amounts supported this movement. This is logically possible because of the presence of the polar oil component, which speeds up interactions among surface liquids. Thus, the polar oil interactions with the brine ions are more significant than the non-polar oil. However, there is a regular eight-shape interaction to modify the wetting state.

Brine-Decane-Calcite System (Before Interaction)

Brine-Decane-Calcite System (After Interaction)

Brine-Acrylic Acid-Calcite System (Before Interaction)

Brine-Acrylic Acid-Calcite System (After Interaction)

Application

The application of this research is where the talk is about water flooding in oil reservoirs to increase oil recovery. Accordingly, the interaction between the engineering brine ions and polar oil components shows a significant improvement toward the mentioned goal. This is because of the improvement of water chemistry and water quality; thus, optimizing the relevant processes and recovery. On the other hand, scientists and physicists can use these fundamentals to advance their studies on tether layers, water films, and membranes.

Conclusion

In this research, the significant contribution of ionic interaction at the surface was underscored through the changes in adsorption energy, radial distribution function, and diffusion coefficient. In this vein, we have found that the higher the degree of sodium ions diffusivity, the more changes in the wetting state of the system. Remarkably, the polar nature of oil was found to be a crucial element in shaping intermolecular interactions, as demonstrated by the visualized changes in configuration. In general, without significant oil polarity, there is minor diffusivity of brine ions into oil molecules. Therefore, the order of factors of importance that contribute to the wettability of a system is oil polarity > brine ions > mineral surface.

References

Adeyemi, B., Jadhawar, P., & Akanji, L. (2021). Surface Complexation Modelling of Potential Determining Ions Sorption on Oil/Brine and Brine/Rock Interfaces. SPE Nigeria Annual International Conference and Exhibition,

Allen, M. P. (2004). Introduction to molecular dynamics simulation. Computational soft matter: from synthetic polymers to proteins, 23(1), 1-28.

Chakravarty, K. H., Fosbøl, P. L., & Thomsen, K. (2015). Brine Crude Oil Interactions at the Oil-Water Interface. SPE Asia Pacific Enhanced Oil Recovery Conference,

Hansson, T., Oostenbrink, C., & van Gunsteren, W. (2002). Molecular dynamics simulations. Current opinion in structural biology, 12(2), 190-196.

Hollingsworth, S. A., & Dror, R. O. (2018). Molecular dynamics simulation for all. Neuron, 99(6), 1129-1143.

Published Book Chapter:
Millennials Fintech Services Adoption:
What Matters Most?

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Introdction to the book

This book explores current and future trends in adopting intelligent technologies, such as the metaverse, social technologies, FinTech applications, and blockchain, among individuals and organizations. The edited book includes empirical and review studies primarily focusing on these issues.

This focus aids scholars in conducting future research in the domain and identifying possible future developments of emerging technologies. The empirical studies in the book utilize recent and advanced analytical techniques for data analysis.

Introduction

.The financial technology (fintech) revolution has transformed the way financial services are assessed and consumed around the world. Fintech narrows the gap between financial institutions and consumers by reducing the cost of accessing finan-cial services, thereby promoting financial inclusion at large. .

.It utilizes techno-logical advancement to enhance various financial activities incorporating both incre-mental measures like APIs and disruptive technologies such as AI and blockchain [2]. Through these innovations, fintech facilitates the provision of a wide range of financial services, transcending traditional business models within the financial industry.

Fintech Market

According to the Department of Statistics Malaysia, the number of millennials in the country has grown steadily, and account for 28% of the total population in 2022.

This figure shows a significant cohort of digitally savvy individuals who can be the prime target for fintech adaptation.

Simultaneously, Malaysia's fintech market has also witnessed remarkable growth [10] due to the support of government initiatives,, regulatory framework, and a vibrant startup ecosystem .
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Challenges

Despite the potential and growth opportunities, the adoption of fintech services among millennials in Malaysia is not without its challenges. Factors such as trust , convenience, relative advantage, services quality and financial knowl-edge play a crucial role in shaping millennials decision-making processes when it comes to engaging with fintech platforms. PwC Malaysia reported that in 2022 while 60% of Malaysian millennials were aware of fintech services, only 28% had adopted them.

Thus, this discrepancy highlights the need for a deeper understanding of the factors driving or impeding fintech adaptation among millennials in Malaysia

Method

.The data were collected from millennials who are in the range of 25–40 years old and currently either working or studying in Malaysia. The population sample could not be easily contacted; hence the snowball sampling method was utilized to choose poten-tial respondents.

Since most of the institutions do not disclose staff information on the website due to privacy issues, some assistance from well-known staff and students was needed to contact the respondents in the first round. In later stages, participants were invited to name potential participants, who were then sent an official invitation email.

Findings and Discussion

We found that consumers who have a higher level of trust in fintech platforms were more likely to use fintech services. Our research also found that customer perceptions of resource availability increased the perceived value of using fintech and stimulated its adoption. Also, given that Malaysian millennials are more inclined to check online ratings on electronic products , their considerable financial knowledge will drive them to choose fintech after gaining an understanding of mutual trust, and Service quality through online reviews.

Millennials, encompassing those individuals born between 1980 and 1996, exhibit a strong proclivity for embracing novel technologies in comparison to other age groups. In order to garner millennials' trust, it is imperative that fintech enter-prises ensure their platforms' robustness and reliability.

Notably, fintech has created opportunities for new entrants into the financial industry, placing traditional enti-ties under the yoke of competition.In light of this phenomena, financial insti-tutions must continue to adapt and innovate to keep up with evolving consumer needs while retaining their market share.

Furthermore, a consequence of millennial fintech adoption is the possibility of enabling greater financial inclusion through offering access to financial services and products that were formerly too expensive or unattainable for many people. Therefore, financial institutions must contemplate how to harness fintech to satisfy all their clients' requirements while simultaneously remain competitive.

Additionally, apprehending the factors that influence millen-nials' adoption of fintech and meeting their demands constitute a critical task for the banking industry. By attending to these concerns, traditional financial institutions can tap into the burgeoning community of fintech-savvy millennials while keeping abreast of new patterns in the industry.
INote:

Although this study has substantial contributions it is not without limitations. This study collected data from Kuala Lumpur and Selangor area, therefore the results derived from this study may not represent the whole country population, and hence we suggest that future studies could collect data from different states of Malaysia. Moreover, we only used ANN analysis which can only tell us which constructs have more influencing power.

IThe full artcile can be accessed at:

Hosen, M., Lim, A. F., Jannat, T., Khan, N. R., & Pek, C. K. (2023). Millennials Fintech Services Adoption: What Matters Most?. In Current and Future Trends on Intelligent Technology Adoption: Volume 1 (pp. 229-243). Cham: Springer Nature Switzerland.

Revolutionizing Environmental Solutions: Advancements in Membrane Technology for Heavy Metal Removal through Additive Manufacturing

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Assistant Professor Dr. Lai Li Sze currently serves as a lecturer in the Department of Chemical and Petroleum Engineering at UCSI University, Malaysia. Over the past decade, Dr. Lai has dedicated her research efforts to the field of gas separation utilizing various membrane technologies, encompassing polymeric, inorganic, composite, and dual-phase membranes. Her active engagement in membrane fabrication involves the application of rapid prototyping, inorganic membrane synthesis, characterization, and gas separation testing. Dr. Lai's expertise extends to computational fluid dynamics simulations for gas separation and modeling gas transport properties. In addition to her individual research pursuits, Dr. Lai has collaborated with researchers from other universities. Notably, she contributed as a team member in the development of non-thermal plasma-based CO_2 conversion technology and the ultrasonic-assisted absorption of bulk CO_2. Dr. Lai's accomplishments also include securing multiple research grants as a principal investigator. These grants predominantly focus on the development of membranes for CO_2 separation and heavy metal removal using additive manufacturing technology. Her dedication to advancing membrane technology underscores her commitment to addressing environmental challenges and contributing valuable insights to the scientific community.

Problem Statement

Heavy metals pose a serious threat to both the environment and human health due to their toxic nature [1]. The Langat River, a crucial water source for the Selangor population, has faced contamination with heavy metals like zinc and lead. This contamination stems from discharges originating from Port Klang and the Klang River, which receive runoff from diverse urban, agricultural, and commercial activities [2]. Various technologies, such as reverse osmosis, ion exchange, electrochemical treatment, irradiation, and extraction, have been employed to address heavy metal pollution in wastewater. However, these methods exhibit limitations, such as high reagent consumption, inconsistent metal ion removal, and the generation of toxic sludge.

The Structure

Membranes featuring specific adsorption groups show promise in effectively removing heavy metals, with a strong affinity for metal ions [3]. However, the performance of the membrane can be limited by the geometry, which mainly affects the effective surface area in heavy metal removal. Over the past few decades, additive manufacturing (AM) has transformed the prototyping and manufacturing industry. Rapid prototyping, a subset of AM, has gained prominence due to its high flexibility [4]. Triply Periodic Minimal Surface (TPMS) structures, formed by repeating minimal surfaces in three dimensions, exhibit unique properties like smooth topology and zero mean curvature. These structures are recognized for their mechanical stability and can facilitate smooth flow transitions without creating dead zones or causing contamination. The interconnected nature of TPMS structures induces turbulence, improving heat and mass transfer. Despite their potential, studies on heavy metal removal using membranes with TPMS structures are limited.
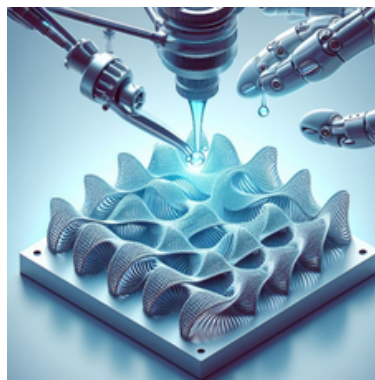

Figure 1. Graphical concept of additive manufacturing in membrane fabrication.

Objectives

This study aims to fill this gap by exploring the use of adsorptive membranes with TPMS structures in heavy metal removal. The hypothesis is that these membranes can enhance removal efficiency through increased specific surface area and porosity. The objectives of the proposal include:

(1) Fabricating defect-free adsorptive membranes with TPMS structures.

(2) Characterizing the resultant membrane using scanning electron microscopy (SEM), Fourier-transform infrared spectroscopy (FTIR), and Differential Scanning Calorimetry (DSC).

(3) Evaluating the heavy metal removal performance of the resultant membrane.

(4) Comparing the performance of the resultant membrane with a flat sheet type of adsorptive membrane.

Methodology

This research holds significance in demonstrating a potential method to address heavy metal pollution and contributes valuable insights to the field. To accomplish this project, the first phase has been designed as screening of TPMS structure and membrane composition. In the following, testing the fabricated and characterized membrane determines if the process is defect-free or not. Accordingly, it is feasible to remove heavy metals and elucidate the involved mechanism.
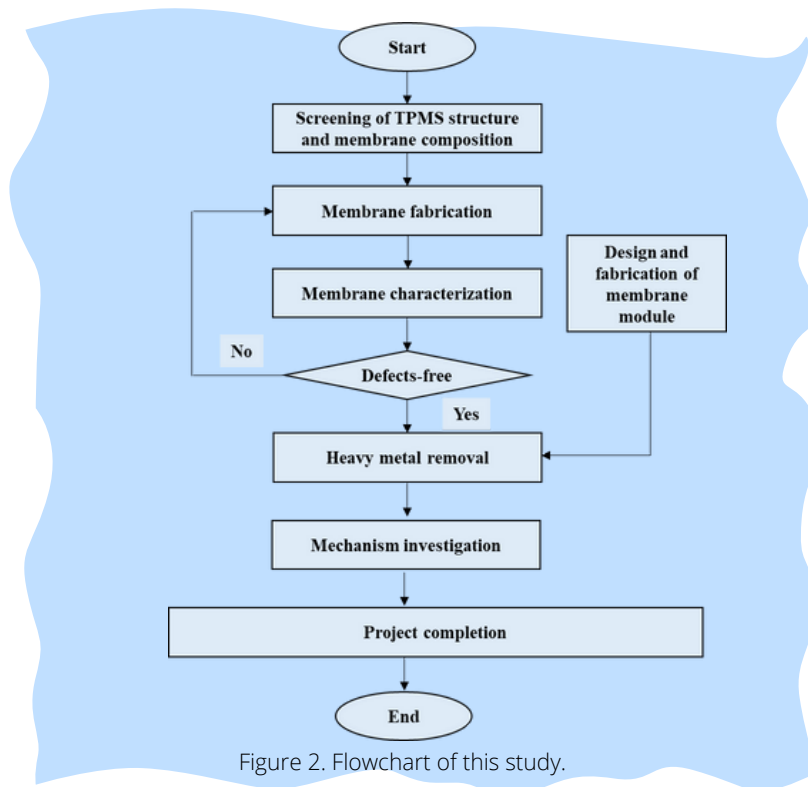
Figure 2. Flowchart of this study.

SDG 6

This research faces a significant challenge. Formulating a chemical composition with 3D printing technique that possesses high heavy metal removal performance, durability, stability, and compatibility is a complex task. However, if successful, this study could lead to the development of durable and highly effective membranes for heavy metal removal. This research aligns with the broader goals of achieving sustainability (SDG 6) and fits into the context of the Fourth Industrial Revolution (IR 4.0), emphasizing additive manufacturing. The development of smart membrane technology is crucial in our journey toward achieving clean water. In favor of society, the adoption of these membranes could create new jobs in the manufacturing and installation of these technologies. This is particularly relevant given the anticipated growth in the Global 3D Printer Market, which is expected to reach a size of 35.36 USD Billion by 2028 [6].

References:

[1] Ismanto, A., Hadibarata, T., Widada, S., Indrayanti, E., Ismunarti, D. H., Safinatunnajah, & et al. (2023). Groundwater contamination status in Malaysia: level of heavy metal, source, health impact, and remediation technologies. Bioprocess and Biosystems Engineering, 46(3), 467-482.

[2] Mokhtar, N. F., Aris, A. Z., & Praveena, S. M. (2015). Preliminary study of heavy metal (Zn, Pb, Cr, Ni) contaminations in Langat river estuary, Selangor. Procedia Environmental Sciences, 30, 285-290.

[3] Vo, T. S., Hossain, M. M., Jeong, H. M., & Kim, K. (2020). Heavy metal removal applications using adsorptive membranes. Nano convergence, 7, 1-26.

[4] Tijing, L. D., Dizon, J. R. C., Ibrahim, I., Nisay, A. R. N., Shon, H. K., & Advincula, R. C. (2020). 3D printing for membrane separation, desalination and water treatment. Applied Materials Today, 18, 100486.

[5] Al-Shimmery, A., Mazinani, S., Flynn, J., Chew, J., & Mattia, D. (2019). 3D printed porous contactors for enhanced oil droplet coalescence. Journal of Membrane Science, 590, 117274.

[6] Global 3D Printers Market Anticipated to Generate a Revenue of $35.36 Billion and Rise at a CAGR 18.00% during the Analysis Timeframe from 2022 to 2028 | Vantage Market Research

Application of Bayesian structural equation modeling in construction and demolition waste management studies: Development of an extended theory of planned behavior

Dr. Nadia Samsudin is a distinguished scholar whose expertise and research focus on the critical intersection of public health and sustainability, underscored by the sophisticated application of applied statistics. Her educational journey began at Universiti Malaya, where she earned a Bachelor of Science in Science and Technology Studies. She furthered her education at the same institution, obtaining a Master of Science in Science, Technology, and Sustainability, followed by a Ph.D. in Science, with her doctoral work specializing in the application of applied statistics to public health. Currently, Dr. Nadia serves as a Post-Doctoral Research Fellow within the Faculty of Social Sciences and Liberal Arts at UCSI University. Her research is pioneering in the fields of public health and sustainability, where she leverages statistical analysis to unpack and address complex health issues. This work not only advances academic knowledge but also aims to produce tangible improvements in public health practices and outcomes. As an expert in applying statistical methodologies to enhance public health and sustainability initiatives, Dr. Nadia's contributions are invaluable. Her work significantly influences the development of informed public health policies and practices, highlighting the importance of interdisciplinary research in promoting progress and ensuring a healthier, more sustainable future for communities worldwide.

Construction and demolition waste (C&DW) is the largest global waste stream, exacerbated by increasing urbanization. Efforts to reduce C&DW have seen varied success worldwide, with recovery rates in cities like Shanghai and Shenzhen exceeding 15% [1,2], but still lagging behind the rates in the United States (70%), Germany (88%), and Japan (96%) [3]. The majority of C&DW ends up in landfills, comprising materials such as concrete, metals, wood, bricks, glass, and asbestos [4,5]. This not only pollutes natural resources but also presents significant management challenges.

Effective C&DW management is hindered by inadequate disposal practices and the lack of integration of behavioral and social factors, which can significantly impact management practices [6]. Recent studies emphasize the importance of human factors, adopting the Theory of Planned Behavior (TPB) as a framework to understand stakeholders' attitudes and behaviors towards C&DW management [7,8] (see Fig 1).
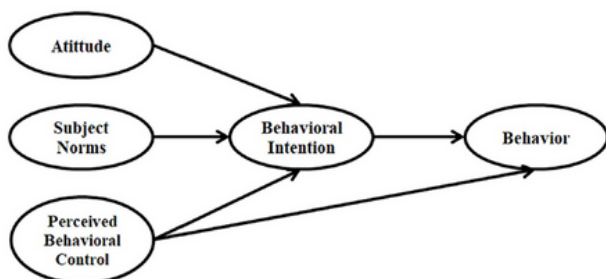

Fig 1. Theory of planned behavior framework

This study aims to extend the TPB by integrating findings from three previous studies [9-11], proposing a comprehensive framework for C&DW management (see Fig 2). The extended TPB framework includes additional factors like Perceived Cost, Perceived Benefit, Personal Norm, Knowledge, Governmental Supervision, Economic Viability, and Project Constraints, which influence individual behavior towards resource efficiency and sustainability.
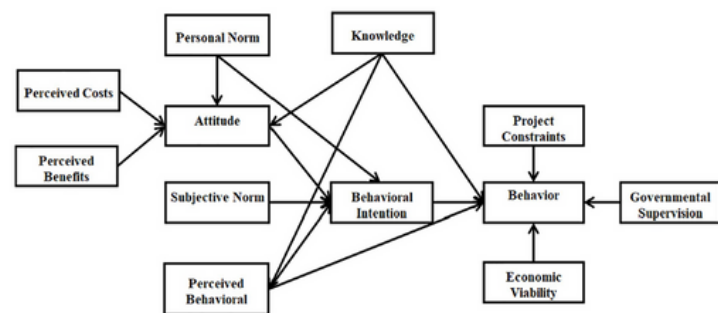

Fig 2. Extended TPB in this study's research framework

Statistical methods like regression, fuzzy approaches, and dynamic system modeling have traditionally analyzed C&DW management within the TPB framework. However, the use of Structural Equation Modeling (SEM) has grown, identifying challenges with the Maximum Likelihood (ML) estimator due to model misspecification, which can lead to biased parameter estimates [12-16]. This study examines alternative SEM estimators that offer more accurate predictions and better understand the relationships among variables.

By comparing different SEM estimators, this research aims to identify more effective ways to model the complexities of C&DW management, leading to better strategies for sustainable management in Malaysia. Insights from this study will help regulators and the private construction sector understand the key drivers of C&DW management behavior, ultimately contributing to more sustainable construction practices.

Reference

1. Spišáková, M., Mésaroš, P., & Mandičák, T. (2021). Construction waste audit in the framework of sustainable waste management in construction projects—Case study. Buildings, 11(2), 61.
2. Ghisellini, P., Cialani, C., Ulgiati, S., & et al. (2018). Evaluating the transition towards cleaner production in the construction and demolition sector of China: A review. Journal of Cleaner Production, 195, 418–434.
3. Ma, M., Tan, Y., Weng, Y., & et al. (2020). Challenges in current construction and demolition waste recycling: A China study. Waste Management, 118, 610–625. https://doi.org/10.1016/j.wasman.2020.09.030
4. Wu, H., Duan, H., Zheng, L., & et al. (2016). Demolition waste generation and recycling potentials in a rapidly developing flagship megacity of South China: Prospective scenarios and implications. Construction and Building Materials, 113, 1007–1016.

UCSI University

UCSI University Showcases SHIPS Graduation Ceremony recognizing the Social Impact of Art in Peer Support for Mental Health Issues

Hidayah Mohd is a psychology lecturer and a passionate clinical psychologist. Her highlights are schema therapy, crisis management, and peer empowerment. She is a good team player and enjoys a diverse work culture environment. She upholds the value of "Diversity Creates Opportunity"

Lee Sze Seau coined the name Jill to appease the native speakers who could not articulate her name. You cannot separate Dr Lee aka Dr Jill, the researcher, from her persona as a teacher. Having trained as a secondary school teacher for subjects such as English language and Literature in English in NTU (Singapore), Dr Jill's unwavering interest in research has been improving pedagogy so that our youth can realise their fullest potential.

Introduction

UCSI University, in collaboration with MywipHealing, is pleased to announce the highly anticipated graduation ceremony of Social Healing Impact Peer Support (SHIPS), a program that emphasizes the social impact of art in providing peer support, and healing space for individuals facing mental health challenges. With support from Yayasan TM, this initiative has been able to provide free art therapy, group peer support, and individual psychotherapy to youth struggling with mental illness. With UCSI University as the esteemed education partner, the SHIPS graduation ceremony aims to celebrate the success of the 10 awardees who have shown extraordinary commitment, attendance, and ownership on their journey towards better mental health. In the context of the SHIPS graduation ceremony, Professor Rogayah A Razak, the Dean of the Faculty of Social Sciences and Liberal Arts, underscores the significance of real-life experiences exchanged within peer support activities. This recognition positions the arts as a formidable instrument for facilitating healing and fostering personal growth. Prof. Rogayah further articulates the institution's commitment to revenue generation through its expertise in clinical and educational settings, with a particular emphasis on authentic peer support learning exchanges. This commitment reflects a dedication to practical and impactful contributions to the fields of clinical and educational practices. Moreover, the ceremony takes pride in honoring remarkable individuals who have exhibited exceptional resilience and determination in overcoming challenges related to mental health. This acknowledgment serves as a testament to the celebration of strength and perseverance within the community, aligning with the institution's commitment to holistic well-being and personal development.

The graduation ceremony took place on 20 January 2024 from 9 am to 12 pm in GG08, Block G of UCSI University. The event was hosted by both the English Language and Psychology Student Association. It was an informative and engaging platform that raised awareness of general well-being and encouraged people to volunteer for mental health support. To add an artistic flair to the ceremony, students from the National Academy of Arts, Culture, and Heritage (ASWARA) captivated the audience with a mesmerizing expressive play that demonstrated the power of creativity in mental health recovery.

The event's recap of the entire year-long initiative was amazing as it showed how well peer support can help youth with mental illness. The awardees shared their life experiences and their journey to recovery and provided a lot of insightful information to the attendees.

"I am now been able to work after being unemployed for three years due to my depression with schizophrenia" Syaz, award receiver.

"I use my anxiety and turn it into the potential of music and am now proud to have my own studio recording" Juno, award receiver.

SUSTAINABLE DEVELOPMENT GOALS 3 GOOD HEALTH AND WELL-BEING | 10 REDUCED INEQUALITIES | 16 PEACE, JUSTICE AND STRONG INSTITUTIONS | 17 PARTNERSHIPS FOR THE GOALS | **SOCIAL HEALING IMPACT PEER SUPPORT (SHIPS)-** Art Therapy Community Intervention

81 Total Program — Total online & on-ground activities that been hosted as at 31 December 2023

28 Total collaboration — Total collaboration partner

200 Total Registered SHIPS — Total registered member for SHIPS peers

5,742 Total Participants — Total number of accumulated online & on-ground program hosted

31,406 Total Beneficiary — Total beneficiary of social impact that calculate from total attendee and social media posting total engagement

40 Total PWDs involve — Total PWDs program that hosted with SHIPS peers

963 Total students — Total community outreach at school under SHIPS program

>300 Total B40 — Estimation total outreach supporting B40 community

>200,000 Total #MYSHIPS23 Reached — Total social media outreach for mental health awareness & healing to mass audience

Full report view here: https://docs.google.com/spreadsheets/d/1si5w1MXK_W6mLanluRSs0o6ZJjZTZqwa3JE1SiSo3/w/edit?usp=sharing

"I have never been celebrated in my life, today is the day I have earned all the hardships and it's paying off that I have shed so much sweat with my borderline personality disorder. Now I lead art seminars for children and realize the meaning of life through it" Nad, award receiver.

"SHIPS has the ability to break down barriers and deeply connect with individuals on an emotional level," Nurul, award receiver.
"We hope to inspire others to use their creative potential as a means to heal and find strength within themselves," said Ms. Khairini, founder of Mywiphealing, who is also diagnosed with Attention Deficit Hyperactivity Disorder (ADHD) and Bipolar 2.

Members of the media, mental health advocates, and the public are invited to experience the transformative power of art in supporting mental health support.

About Yayasan TM:
Established in 2003, Yayasan TM is the corporate social responsibility (CSR) arm of Telekom Malaysia Berhad (TM). The foundation focuses on education and community well-being, bringing positive change through various programs and initiatives. For more information, please visit www.yayasantm.org.my.

About Mywiphealing:
MyWIPHealing is a community platform dedicated to promoting mental health and healing through artistic expression. SHIPS project focuses on supporting individuals on their mental health journey by integrating art and social support module. This initiative aims to improve skills and competencies and promote better recovery through art therapy and peer support. SHIPS seeks to raise public awareness of mental health and healing initiatives through a social media campaign under the hashtag #MYSHIPS23.

No	Funding Scheme	Submission Close Date
1	**International Science Partnerships Fund (ISPF)** *https://www.britishcouncil.org/education/he-science/our-work/international-science-partnerships-fund*	**8 January 2024 - 5 March 2024**
2	**Malaysia Toray Science Foundation 2024** *https://www.mtsf.org/*	**1st January 2024 - 31st May 2024**
3	**DR Ranjeet Bhagwan Singh (RBS) Medical Research Grant** *https://www.akademisains.gov.my/2024-rbs/*	**1 January 2024 - 29 February 2024**
4	**National Conservation Trust Fund (NCTF)** *https://www.ketsa.gov.my/en-my/KetsaCore/Biodiversity/Pages/nctf.aspx*	**Open all year round**
5	**Global Funding for Rubber Innovation** *https://www.myrubbercouncil.com/globalrubberfund/index.php*	**Open all year round**
6	**MOSTI Grants** *https://sdb.mosti.gov.my/sdbcms/ms/garispanduan/*	**Open all year round**
7	**Fundamental Research Grant Scheme (FRGS)** *https://mygrants.gov.my/main.php?Content=articles&ArticleID=1&IID=*	**28 February 2024**

Please refer to your respective Head of Research for more information.

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